

PATENT  
Atty. Dkt. No. APPM/008266/PPC/ECP/CKIM  
Serial No.: 10/781,040

## REMARKS

This is intended as a full and complete response to the Office Action dated December 8, 2005, having a shortened statutory period for response set to expire on March 8, 2006. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1-20 remain pending in the application and are shown above. Claims 1-20 stand rejected by the Examiner. Claims 7, 11, 17, and 18 are cancelled without prejudice. Claim 19 is amended to correct informality. Claims 1, 8, and 15 are amended to clarify the invention and to include the limitations of claims 7, 11, 17, and 18, as supported by the Specification and Drawings at least at paragraphs 25 and 31, and Figure 8 without introducing new matter. Applicant reserves the right to pursue the subject matter of the original claims 1, 7-8, 11, 15, and 17-19 at a later date. Reconsideration of the rejected claims is requested for reasons presented below.

### ***Claim Rejections - 35 USC § 102***

Claims 1-4, 7-9, 11-13 and 15-17 stand rejected under 35 USC § 102(e) as being anticipated by *Dordi et al.* (US Patent No. 6,582,578).

Applicant respectfully traverses the rejection. Claims 1, 8, 15 and claims dependent thereon are amended to include positioning the substrate at a processing angle such that a plating surface of the substrate is positioned substantially parallel to a surface of the anode placed in the fluid solution, wherein the anode is tilted between about 3° and about 30°.

*Dordi et al.* discloses an electro-chemical plating system and a plating method. The method of *Dordi et al.* includes immersing the substrate by vertically displacing the substrate into an electrolyte solution while maintaining the substrate at a tilt angle above the electrolyte solution and positioning the substrate substantially horizontal prior to plating a material on the substrate.

*Dordi et al.* does not disclose a tilted plating cell. In addition, *Dordi et al.* does not teach, show or suggest tilting a receiving member to a first tilt angle, a second tilt angle and a processing angle, and positioning the substrate such that a plating surface of the substrate is positioned substantially parallel to a surface of the anode, wherein the anode is tilted between about 3° and about 30°, as recited in amended claims 1, 8, 16 and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

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Claims 1-4, 7-9 and 11-14 stand rejected under 35 USC § 102(e) as being anticipated by *Sendai et al.* (US Patent Application No. 2003/0057098). Applicant respectfully traverses the rejection.

*Sendai et al.* discloses an electro-chemical plating system having a tilt mechanism and a head portion for holding a substrate, and a method of immersing the wafer by tilting the substrate in an inclined angle of  $\alpha$  which is  $1^\circ$  to  $10^\circ$ . (See, Figures 1-9 and paragraphs 0022-0025.) *Sendai et al.* also discloses that, after the surface of the substrate is immersed into a plating solution of a plating cell, the substrate is brought back to a horizontal position for processing the substrate, when the plating cell is stationed horizontally. (See, Figures 3-4 paragraphs 0022-0025 and 0080-0087.) Alternatively, when the plating cell and the anode therein is stationed at an inclined angle of  $\beta$ , *Sendai et al.* discloses tilting the substrate in an inclined angle of  $\beta$  before and after the surface of the substrate is immersed into a plating solution of a plating cell without having to bring the substrate back to horizontal such that the substrate and the anode are tilted at the same inclined angle of  $\beta$  during both immersion and plating processes. (See, Figures 11-12 and paragraphs 0091-0096.)

*Sendai et al.* does not disclose a method for immersing a substrate held by a receiving member including positioning the receiving member to a first tilt angle, a second tilt angle, and a processing position, as well as positioning the substrate such that a plating surface of the substrate is positioned substantially parallel to a surface of the anode placed in the plating cell. Therefore, *Sendai et al.* does not teach, show or suggest a method for immersing a substrate into a fluid solution having an anode placed therein, including loading a substrate into a receiving member, tilting the receiving member to a first tilt angle, displacing the receiving member toward the fluid solution at the first tilt angle, tilting the receiving member to a second tilt angle different from the first tilt angle, positioning the substrate at a processing angle such that a plating surface of the substrate is positioned substantially parallel to a surface of the anode placed in the fluid solution, wherein the anode is tilted between about  $3^\circ$  and about  $30^\circ$ , as recited in claim 1 and claims dependent thereon.

In addition, *Sendai et al.* does not disclose vertically actuating the substrate toward a fluid solution having an anode placed therein while maintaining a tilt angle, reducing the tilt angle of a substrate once the substrate contacts the fluid solution and

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while continuing the vertical actuation of the substrate, and positioning the substrate at a processing angle. Therefore, *Sendai et al.* does not teach, show or suggest a method including tilting the substrate to a tilt angle measured from horizontal, vertically actuating the substrate toward a fluid solution having an anode placed therein while maintaining the tilt angle, reducing the tilt angle to about horizontal once the substrate contacts the fluid solution while continuing the vertical actuation of the substrate, and positioning the substrate at a processing angle such that a plating surface of the substrate is positioned substantially parallel to a surface of the anode placed in the fluid solution, wherein the anode is tilted between about 3° and about 30°, as recited in amended claim 8 and claims dependent thereon. Withdrawal of the rejection is respectfully requested.

### ***Claim Rejections - 35 USC § 103***

Claims 5, 6, 10, and 19 stand rejected under 35 USC § 103(a) as being obvious over *Dordi et al.* in view of *Wang et al.* (US Patent Application No. 2002/0084189). Applicant respectfully traverses the rejection.

*Dordi et al.* has been discussed above.

*Wang et al.* discloses an electro-chemical plating system and a plating method. *Wang et al.* does not disclose a tilted anode in a plating cell being tilted at an angle of between about 3° and about 30° and a plating surface of the substrate is positioned substantially parallel to a surface of the anode, as recited in amended claims 1, 8, 15, which claims 5, 6, 10, and 19 are dependent on, and lacking in *Dordi et al.* Therefore, *Dordi et al.* in view of *Wang et al.*, alone or in combination, does not teach, show, or suggest the subject matter, as recited in claim 5, 6, 10, and 19. Withdrawal of the rejection is respectfully requested.

Claims 14, 18, and 20 stand rejected under 35 USC § 103(a) as being obvious over *Dordi et al.* in view of *Sendai et al.* or *Lubomirsky et al.* (US Patent Application No. 2004/0016648). Applicant respectfully traverses the rejection.

*Dordi et al.* and *Sendai et al.* have been discussed above. Applicant respectfully points out that there is no suggestion or motivation of the claimed subject matter in the combined teachings of the references. The Examiner has failed to show a clear and particular motivation by the skilled artisan to select from the disclosure of *Dordi et al.* with *Sendai et al.* On this point, the Federal Circuit has ruled that "[o]ne cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art

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to deprecate the claimed invention." (*In re Fritch* at 1784). In order to avoid using the Applicant's disclosure as a blueprint to pick and choose certain elements, while ignoring others, the Examiner must supply a clear and particular motivation or suggestion to do so. In the present case, there is no suggestion in *Dordi et al.* in view of *Sendai et al.* and the only suggestion is provided in the Applicant's disclosure and thus hindsight.

In addition, as discussed above, *Dordi et al.* in view of *Sendai et al.*, alone or in combination, does not teach, show or suggest vertically actuating the substrate toward a fluid solution having an anode placed therein while maintaining the tilt angle, reducing the tilt angle of a substrate once the substrate contacts the fluid solution and while continuing the vertical actuation of the substrate, and positioning the substrate at a processing angle such that a plating surface of the substrate is positioned substantially parallel to a surface of the anode, wherein the anode is tilted at a tilt angle. Therefore, *Dordi et al.* in view of *Sendai et al.*, alone or in combination, does not teach, show or suggest a method including tilting the substrate to a tilt angle measured from horizontal, vertically actuating the substrate toward a fluid solution having an anode placed therein while maintaining the tilt angle, reducing the tilt angle to about horizontal once the substrate contacts the fluid solution and while continuing the vertical actuation of the substrate, and positioning the substrate at a processing angle such that a plating surface of the substrate is positioned substantially parallel to a surface of the anode placed in the fluid solution, wherein the anode is tilted between about 3° and about 30°, as recited in amended claim 8, which claim 14 is dependent on.

Further, *Dordi et al.* in view of *Sendai et al.*, alone or in combination, does not teach, show or suggest tilting a contact ring to a tilt angle, reducing the tilt angle to about horizontal when the contact ring initially touches the plating electrolyte, and positioning the substrate in a processing position such that a plating surface of the substrate is positioned substantially parallel to a surface of the anode, wherein the anode is tilted. Therefore, *Dordi et al.* in view of *Sendai et al.*, alone or in combination, does not teach, show or suggest a method for immersing a substrate into a plating electrolyte having an anode placed therein, including positioning the substrate on a contact ring, securing the substrate to the contact ring with a thrust plate assembly, tilting the contact ring to a tilt angle of between about 3° and about 7°, vertically actuating the contact ring toward the plating electrolyte while maintaining the tilt angle,

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rotating the contact ring at a rotation rate of between about 30 rpm and about 120 rpm, reducing the tilt angle to about horizontal when the contact ring initially touches the plating electrolyte, and positioning the substrate in a processing position such that a plating surface of the substrate is positioned substantially parallel to a surface of the anode positioned in the plating electrolyte, wherein the anode is tilted between about 3° and about 30°, as recited in amended claim 15, which claims 18 and 20 are dependent on.

*Lubomirsky et al.* discloses a plating apparatus having a substrate support assembly configured to support a substrate at a constant angle. *Lubomirsky et al.* also discloses a method of immersing a substrate at the constant angle into an electrochemical plating solution contained in a plating cell of the plating apparatus where the plating cell is tilted to an angle from horizontal such that the surface of the substrate and the surface of an anode of the plating cell are parallel to each other during the substrate immersion and plating processes. Since *Lubomirsky et al.* teaches the substrate being held at a constant angle during the substrate immersion and plating processes, combination of *Lubomirsky et al.* with *Dordi et al.*, which discloses the substrate being held at non-constant positions including a tilt angled position and a horizontal position, does not motivate combination of a tilt angle and a horizontal. The examiner has used hindsight reconstruction and thus has not provided a prima facie case of obviousness. The burden for establishing a prima facie case of obviousness falls on the Examiner. See, *MPEP* §2142. In addition, there is no suggestion or motivation of the claimed subject matter in the combined teachings of the references. Applicant submits that "[t]he showing of a motivation to combine must be clear and particular, and it must be supported by actual evidence. *In re Dembiczak*, 50 U.S.P.Q. 2d 1614, 1617 (Fed. Cir. 1999). Further, *Lubomirsky et al.* teaches the substrate being held at a constant angle without motivation for tilting a receiving member of a substrate support assembly to a first tilt angle, vertically displacing the receiving member, and reducing the tilt angle to about horizontal once the substrate contacts a fluid solution and positioning the substrate at a processing angle such that a plating surface of the substrate is positioned substantially parallel to a surface of the anode positioned in the plating electrolyte, wherein the anode is tilted between about 3° and about 30°.

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Therefore, *Dordi et al.* in view of *Lubomirsky et al.*, alone or in combination, does not teach, show or suggest the subject matter as claimed in claims 14, 18 and 20.

Accordingly, *Dordi et al.* in view of *Sendai et al.* or *Lubomirsky et al.*, alone or in combination, does not teach, show or suggest the subject matter as claimed in claims 14, 18 and 20. Withdrawal of the rejection is respectfully requested.

Claims 15-18 and 20 stand rejected under 35 USC § 103(a) as being obvious over *Sendai et al.* in view of *Dordi et al.* Applicant respectfully traverses the rejection.

*Sendai et al.* and *Dordi et al.* have been discussed above and there is no suggestion or motivation of the claimed subject matter in the combined teachings of the references. Applicant has amended claim 15, which claims 16-18 and 20 are dependent on. Accordingly, *Sendai et al.* and *Dordi et al.*, alone or in combination, does not teach, show or suggest the subject matter as claimed in claims 15-18 and 20. Withdrawal of the rejection is respectfully requested.

Claim 19 stands rejected under 35 USC § 103(a) as being obvious over *Sendai et al.* in view of *Dordi et al.*, and further in view of *Wang et al.* Applicant respectfully traverses the rejection.

*Sendai et al.*, *Dordi et al.*, and *Wang et al.* have been discussed above. In addition, there is no suggestion or motivation of the claimed subject matter in the combined teachings of the references. Applicant has amended claim 15, which claim 19 is dependent on. Accordingly, *Sendai et al.* in view of *Dordi et al.*, and further in view of *Wang et al.*, alone or in combination, does not teach, show or suggest the subject matter as claimed in claim 19. Withdrawal of the rejection is respectfully requested.

Claims 5, 6 and 10 stand rejected under 35 USC § 103(a) as being obvious over *Sendai et al.* in view of *Wang et al.* Applicant respectfully traverses the rejection.

*Sendai et al.* and *Wang et al.* have been discussed above. In addition, there is no suggestion or motivation of the claimed subject matter in the combined teachings of the references. Applicant has amended claims 1 and 8, which claims 5, 6 and 10 are dependent on. Accordingly, *Sendai et al.* in view of *Wang et al.*, alone or in combination, does not teach, show or suggest the subject matter as claimed in claims 5, 6 and 10. Withdrawal of the rejection is respectfully requested.

Applicant has presented new claims 21-26 for consideration by the Examiner. Applicant submits that claims 21-26 are supported by the Specification and Drawings at

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least at paragraphs 30-40 and Figures 6-9 without introducing new matter. Claims 21-22 are dependent on claims 1 and 8, respectively, and allowable for reasons discussed above. In addition, Applicant submits that *Dordi et al.*, *Sendai et al.*, *Wang et al.*, and *Lubomirsky et al.*, alone or in combination, does not teach, show or suggest tilting the receiving member from the first tilt angle through an intermediate position to the second tilt angle while maintaining the receiving member and the substrate loaded thereon immersed in the fluid solution, wherein at the intermediate position the surface of the substrate is substantially parallel to the surface of the anode, as recited in claims 21-22.

Further, Applicant submits that *Dordi et al.*, *Sendai et al.*, *Wang et al.*, and *Lubomirsky et al.*, alone or in combination, does not teach, show or suggest loading a substrate into a receiving member of a plating apparatus, tilting the receiving member to a first tilt angle relative to a surface of the anode, immersing the substrate into the plating solution contained in a plating cell, pivoting the receiving member from the first tilt angle through an intermediate position to a second tilt angle while maintaining the substrate immersed in the plating solution, wherein at the intermediate position the surface of the substrate is substantially parallel to the surface of the anode, and tilting the substrate being held by the receiving member from the second tilt angle into a third tilt angle such that a plating surface of the substrate is positioned substantially parallel to the surface of the anode, as recited in claims 23-26.

In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed.

Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



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